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TELECONFERENCING SYSTEM AND METHOD

2

CROSS REFERENCES

3 The present application is related to the following application even dated herewith:
4 Attorney docket number CH919990036US1, patent application No. (to be assigned),
5 entitled, "Presence Information Method and System," by inventors G. Dermler et al.,
6 which is incorporated herein by reference in entirety for all purposes.

7

1. Field of the Invention

8 The present invention is generally directed to the art of teleconferencing and
9 specifically to improved teleconferencing systems, methods and programs.

10

2 Prior Art

11 Multiparty conferencing is a feature found in the Public Switched Telephone
12 Network (PSTN), in the Integrated Services Digital Network (ISDN), in private telephone
13 networks (PTN), and in IP telephony networks (IPTel). There exist voice conferences
14 which have only an audio session, as well as video conferences which have an audio and a
15 video session. The latter sometimes also include a data collaboration session.

16

17 The most common form of setting up a conference-type communication session is
18 to arrange it in advance, e.g. several hours or days before the start of the conference)
19 because the conference needs special resources, for example a conference bridge for
mixing various audio and video signals, which may be limited.

20

21 For example, reservation may be done by calling an operator, or by filling out a
22 form on a web-site. In other words, the participants of the intended conference must have
agreed beforehand on the time when the conference is to take place.

23

24 At the time of reservation the number of participants usually has to be specified to
reserve the required and appropriate conference bridge. At the actual start of the

1 conference there are two ways in which the participants can join the conference: In the
2 first method, the participants are invited into the conference; typically, they receive a call
3 either by one of the conference participants or by an operator. In the second method the
4 participants are given a specific and unique telephone number, and they join the
5 conference by calling this number.

6 In the ITU-T Recommendation H.323 [H.323] defines another form of conference
7 called "ad-hoc conference". With an ad-hoc conferencing a normal call between two
8 participants (a point-to-point call) is expanded into a conference (a multi-participant call).
9 One of the participants who is already present simply calls additional participants which
10 are taken into the conference when they answer the call.

11 With IP telephony technology - on the other hand - it is possible to hold
12 conference-type communication sessions without special resources, such as a conference
13 bridge. Consequently, there would be no need to arrange for a conference-type session in
14 advance.

15 "Presence" is a relatively new mode of communication that has recently become
16 very popular in the Internet. "Internet Presence" is a service that allows a user A to
17 declare his interest in the presence information of another user B (he is said to "subscribe"
18 to the presence information of user B). The terminal of user B publishes presence informa-
19 tion about user B. The service delivers notifications to A each time the presence
20 information of B changes.

21 The presence information of a user roughly is information about what the user is
22 currently doing. For example, presence information may include whether or not the user is
23 currently connected to the Internet, whether or not the user is currently having a telephone
24 call, or whether or not the user has interacted with his terminal recently.

25 Most telephone systems collect presence information about their users for internal
26 purposes, without offering a presence service to their users:

27 For example, the PSTN (Public Switched Telephone Network) is able to monitor
28 the status of a telephone line of a subscriber and to determine whether the user is busy or

1 not. The event that a telephone line changes from "busy state" to "not busy state" is a
2 piece of presence information. It indicates that during the next seconds there is a high
3 likelihood that the user would be able to answer a call.

4 Another example is that of a network for mobile telephony which provides a
5 procedure for the mobile cellular telephones to register with the network before the
6 mobile telephone can receive or make a call. The network keeps track of the registration
7 status. The fact that a mobile telephone is registered and not having a call is a piece of
8 presence information.

9 The standard ECMA-185 "Private Telecommunication Network - Specification,
10 Functional Model and Information Flows - Call Completion Supplementary Services"
11 [ECMA-185] defines two services as "call completion supplementary" services:

- 12 (1) Completion of Call to Busy Subscriber (CCBS) and
13 (2) Completion of Call on No Reply (CCNR).

14 These services allow to automatically retry a call later in case the called user could
15 not answer, for example because he was on another call (in the case of CCBS), or he was
16 not replying (in the case of CCNR).

17 The advantage of this type of services is that the system automatically retries the
18 call when the called user is no longer busy (in the case of CCBS as explained below) or
19 when the called user is now known to be available (in the case of CCNR as explained
20 below). A telephone-type communication system accomplishes this by constantly
21 monitoring the line of the called user.

22 **OBJECTS AND BRIEF SUMMARY OF THE INVENTION.**

23 Accordingly, it is a main object of the invention to provide for a an improved
24 system for initiating a teleconference and/or to facilitate establishing an ad-hoc conference.

25 Another object of the invention is to enable the use of presence information for
26 improving the results of other types of communication services, such as
27 completion-of-call-on-no-reply, wake-up calls, event notification and other related forms
28 of telecommunication capable of benefiting from evaluation of presence information.

1 Further objects will become apparent as this specification proceeds.

2 These objects and further advantages will be achieved, according to the invention
3 by a teleconferencing system as specified in claim 1. Preferred forms of the system are
4 defined in claims 2 – 5. The invention further provides for a teleconferencing method as
5 defined in claims 6 and 7 and a program for initiating teleconferences as defined in claims
6 8 and 9.

7 Generally, the teleconferencing system according to the invention comprises at
8 least one telecommunication system and may comprise a plurality of telecommunication
9 services, e.g. a PSTN, an ISDN, an IPTel, a PTN, a mobile telephone system that may but
10 need not be connected to another telephone system; further, the system comprises at least
11 two subscriber terminals which may either be connected to the same telecommunication
12 system, for example, when only one telephone system is involved, or be connected to
13 different networks that are part of the teleconferencing system according to the invention;
14 the system according to the invention includes an electronic computing means, e.g. a
15 server-type computer, connected any participating telecommunication system; the
16 electronic computing means or server, in turn, includes a conference initiating program
17 (also termed "special program" hereinafter).

18 The teleconferencing system according to the invention further includes means for
19 providing an availability or "presence" signal associated with each subscriber terminal;
20 such means are known per se or disclosed in the cross-referenced, co-pending application,
21 docket number: CH919990036US1, for creating an availability signal in case of the PSTN
22 and cellular telephone networks.

23 "Association" of the means for providing the availability signal is intended to point
24 to the fact that such means could be an integrated or separate part of the subscriber
25 terminal, or be a feature of the telecommunication system to which the subscriber terminal
26 is connected.

27 For example, the availability signal can be gained from such presence services as
28 are available in the Internet from various providers (e.g. AOL instant messenger, YAHOO
29 messenger or MSN messenger).

1 The availability signal must be accessible to the electronic computing means or
2 server computer. In turn, the conference initiating program that is operated by the server
3 computer must be accessible to each subscriber terminal so that the subscriber who
4 operates the subscriber terminal is capable of causing a conference call to any other
5 subscriber terminal as soon as the availability signal of the other subscriber terminal
6 indicates availability. While a conference call can be initiated by any subscriber, this does
7 not preclude that the conference initiating program includes a priority system such that
8 only selected users are capable of initiating a conference call while, on the other hand, all
9 subscribers should be able to obtain the conference call as soon as they are available. In
10 other words, all subscribers could be authorized, or authorization to initiate conference
11 call could be restricted to selected users; obviously, such operating parameters could be
12 administered by the conference initiating program which would normally – i. e. without
13 such a programmable hierarchy - treat all subscriber terminals as equal by keeping track of
14 the availability signal of each subscriber terminal as well as by accepting a conference call
15 from any of them and forwarding it to any of them.

16 It should be noted in this context that the term "subscriber terminal" and
17 "subscriber" are used synonymously to some extent herein. Obviously, any terminal
18 connected to the respective telecommunication system would become a "subscriber
19 terminal" whenever it is being operated by a person who can identify herself or himself as
20 a subscriber. By the same token, an availability signal from any given subscriber terminal
21 does not necessarily imply that the subscriber is actually "available" in the sense of being
22 physically present. For example, the subscriber could have left the terminal or not be
23 willing or able to perceive the conference call that is exhibited by her/his terminal.

24 The availability signal must be accessible to the server, and any participating
25 telecommunication system must be capable of cooperating with the special program for
26 initiating a conference between the subscriber terminals. Gateway devices known in the art
27 may be used for this purpose to interconnect any two telecommunication services that
28 participate in the teleconferencing system according to the present invention that but
29 would not be compatible without such a device.

1 The special program initiates a conference – in the general sense explained above -
2 between the subscriber terminals by attempting transmission of a conference call when
3 such call is requested by any of the subscriber terminals; the conference call is transmitted
4 to each subscriber terminal as soon as its associated availability signal indicates availability
5 of that terminal.

6 In a second general embodiment, the present invention provides for a
7 teleconferencing method for use in one or more telecommunication systems. Again, two
8 or more subscriber terminals are connected to the telecommunication system, or systems,
9 and – again – the telecommunication system(s) is/are connected with a server-type
10 computer which operates a conference initiating program and each subscriber terminal
11 generates, or is associated with, with an availability signal. Preferably, at least one of the
12 telecommunication systems is capable of transmitting data streams of differing media, e.g.
13 audio and video.

14 When a conference call is initiated by an authorized subscriber this call is relayed
15 to any other subscriber terminal as soon as the availability signal indicates it's availability.

16 Further, the invention provides for a conference initiating program for use in a
17 teleconferencing system formed by one or more telecommunication systems with two or
18 more connected subscriber terminals and a connected server-type computer capable of
19 running the conference initiating program according to the invention. A main function of
20 this program would, of course, be to evaluate the availability signal of all subscriber
21 terminals and to call each subscriber terminal as soon as its availability is indicated.

22 The term "telecommunication system" as used herein is intended to refer to any
23 specific telecommunication network as well as to any system resulting from
24 interconnection of two or more specific telecommunication networks. Typical and
25 preferred examples of telecommunication systems suitable for the present invention have
26 been cited above.

27 The term "availability signal" of a terminal is used in the sense of "presence
28 information" and refers to a signal that indicates whether a call to that terminal is possible,
29 i. e. that the terminal is accessible to a call. Such means are known per se for or are

1 subject of our contemporaneously filed, cross-referenced patent application, having
2 Attorney docket number CH919990036US1.

3 Further, it should be emphasized that the term "teleconferencing" is intended
4 herein to not only include ad-hoc conferencing and similar telecommunications but
5 services of the types mentioned above. In other words,
6 the terms "call" and "conference" as used herein synonymously to designate a
7 communication transaction so that a "call" could also be conceived a "two-party
8 communication transaction" while a "conference" is a communication transaction between
9 more than two parties.

10 DETAILED DESCRIPTION OF THE INVENTION

11 The method of operating a telecommunication system according to the invention
12 as well as such as system will now be explained in more detail with reference to the
13 enclosed drawing in which the only Figure 1 represent a diagrammatic illustration of the
14 components of a teleconferencing system according to the invention.

15 Specifically, Fig. 1 shows a diagrammatic presentation of one embodiment of a
16 teleconferencing system (10) according to the invention. It includes three
17 telecommunication systems 1,2,3, e.g. a PSTN, an ISDN, and an IPTel; alternatively or
18 additionally, system 10 could include a PTN, an Internet or an Intranet. Gateways 91, 92,
19 93 are used to provide interoperability if this is needed for interconnection of systems
20 which would not normally be interoperable.

21 At least two subscriber terminals 61, 71 are connected to the same or to different
22 telecommunication systems 1,2,3, but, normally, a plurality of subscriber terminals will
23 participate, only three (61,62,63;71,72,73;81,82,83) being represented in Fig. 1. Any of
24 these subscriber terminals could be connected to any telecommunication system 1,2,3.
25 Actual subscribers U₁, U₂, U₃ could have one or more terminals which, when properly
26 operated by the subscriber, e.g. by user identification and/or password, would become
27 "subscriber terminals". Of course, a subscriber may operate more than one terminal as a
28 subscriber terminal. Non-subscriber terminals connected to systems 1,2,3 could and

1 normally would also be connected to each system 1,2,3 but are not shown in Fig. 1.
2 Each telecommunication system 1,2,3 that is included in a teleconferencing system
3 10 according to the invention is, in turn, connected with a server-type computer or
4 equivalent electronic computing device. It is to be noted that the lines shown in Fig. 1
5 indicate operative connections of any suitable form, e.g. connecting lines of any suitable
6 type or connections by way of infrared or microwave transmission techniques.

7 Server 4 runs a teleconferencing program 5 which in addition to any normal
8 functions for operation, identification and the like incorporates special functions for
9 receiving and evaluating availability signals from each subscriber terminal, receiving
10 conference call request from any subscriber terminal, optionally evaluating a privilege
11 status, and emitting conference initiation calls to any subscriber terminal as soon as the
12 availability thereof is established by program 5.

13 When a subscribed user of the conferencing service invokes the conference
14 service, he gives to the system a list of users that are to become participants in a
15 conference. The user may or may not include himself in the list. The system then starts to
16 monitor every subscriber terminal in the list. The system determines for each user from the
17 presence information available from that user if he is likely to participate in the conference
18 and invites each user by placing a call to him.

19 A main benefit of the invention for conferencing is that the conference participants
20 do not have to wait for each other. They are only alerted when the system has determined
21 for all prospective participants a high probability to be available.

22 In the beginning, the conference with a system according to the invention is in a
23 state in which some users are already participating in the conference (because they
24 answered the call) while other users are still being alerted. It is up to the users already
25 present to decide if they want to start the conference conversation or wait for other users
26 to join. Some users may actually never answer the call because the conferencing service
27 according to the invention does not guarantee that an available subscriber will actually
28 enter into communication.

29 Thus, the conference may never reach the state where all prospective participants

1 have joined. This is not an abnormal situation. If the participants decide to wait for others
2 and to postpone the conference, one of the participants simply invokes the service again.
3 To prevent the service from immediately starting the conference again, the service
4 subscriber has the option to raise the bar on the criterion for the availability of a user.

The availability or presence information that the system has of a user may come from a variety of sources, as mentioned above, e.g.

- from monitoring a PSTN, ISDN or PTN telephone line,
 - from the network registration of a mobile phone,
 - from a terminal that is part of an Internet presence service.

EXAMPLES

11 The following examples of an operation of a system according to the invention are
12 intended for illustration and not limitation.

13 Example 1

This example illustrates the case of a multiple telecommunication systems with no gateways for use according to the invention:

16 First step: user A - a subscriber to the conference call system according to the invention -
17 makes a call to user B using telecommunication system 1 but user B – also a subscriber to
18 the conference call system does not answer.

19 Second step: user A requests the conference initiating program to connect him to user B.

20 Third step: the conference initiating program starts to process availability signals from A's
21 and B's terminals.

22 Fourth step: a terminal of user A becomes available which is connected to
23 telecommunication systems 1 and 2, and the conference initiating program receives a
24 corresponding availability signal.

25 Fifth step: a terminal of user B becomes available which is connected to
26 telecommunication systems 2 and 3 and the conference initiating program receives a
27 corresponding availability signal.

1 Sixth step: the conference initiating program detects that a terminal of user A and a
2 terminal of user B are available and connected to the common telecommunication system,
3 i.e. communication system 2, and initiates a call or two-party conference between these
4 terminals using telecommunication system 2.
5 The sequence explained in this example will initiate a multiparty conference in the same
6 manner by corresponding repetitions for calling additional subscriber terminals.

7 Example 2

8 This example illustrates the case of several interconnected communication systems, i.e.
9 telecommunication system 1 and 2 interconnected by means of a gateway.

10 First step: as in Example 1.

11 Second step: as in Example 1

12 Third step: as in Example 1.

13 Fourth step: a terminal of user A becomes available which is connected to
14 telecommunication system 1 and the conference initiating program receives a
15 corresponding availability signal. Fifth step: a terminal of user B becomes available which
16 is connected to telecommunication system 2 and the conference initiating program
17 receives a corresponding availability signal.

18 Sixth step: the conference initiating program detects that a terminal of user A and a
19 terminal of user B are available and connected to gateway-connected telecommunication
20 systems, and initiates a call – again a two-party conference - between these terminals using
21 telecommunication system 1 and 2 and the gateway.

22 The sequence explained in this example will initiate a conference in the same manner by
23 repetitions for calling additional subscriber terminals.

24 The presence or availability information disclosed herein can be generalized to the
25 extent that it is independent of any specific communication services: instead of being
26 available within a specific communication service, a subscribed user could be available at a
27 certain terminal. This kind of availability or presence information could be generated either
28 explicitly by the user himself, e.g. by a registration procedure, or implicitly, by the terminal

1 which "observes" or registers the user's activities which are local at this terminal. Another
2 implicit generation of user presence or availability could be effected by the network which
3 would "observe" or register the user's activities which have an impact upon the network,
4 e.g. making a call.

5 The presence or availability information can even be generalized to a specific
6 locality. For example, combining with a badge-reading device, the present system can
7 determine the presence of a user within a building or within a specific room.

8 Based on this generalized aspect, various "completion of call" services can be
9 implemented besides the one described above. Specific examples include the following:

10 (I) Completion of call on no reply:

11 User A makes a phone call to user B but B does not answer;

12 User A requests the system to connect him to user B as soon as B is available;
13 user B is now available at a certain terminal (or in a certain room);

14 Knowing the capabilities of the terminals at which users A and B are available,
15 the system establishes an appropriate communications means between users A
16 and B. For example, if users A and B are both at a workstation which supports
17 instant messaging, the system pops up a window at A's terminal and tells A that
18 he can now communicate with B via instant messaging.

19 Similarly, if user B was available in a certain room, the system could determine
20 which terminals are available in this room (e.g. using some database) and then
21 connect user A with user B using the appropriate terminals.

22 (II) Wake-up calls:

23 User A requests the system to remind him of a certain event at a certain day
24 and time; at this day and time, the system establishes a call to the terminal at
25 which user A is currently available, using the communication service which is
26 supported by that terminal.

1 (III) Instant notification:

2 User A requests the system to notify him immediately when a certain event
3 occurs (e.g. stock price warning, weather warning in outdoor sports activities
4 such as mountain climbing, sailing, canoeing, etc.); when the event happens,
5 the system establishes a call to the terminal at which user A is currently
6 available, using the communications service which is supported by the terminal.

7 The present invention can be realized in hardware, software, or a combination of
8 hardware and software. The present invention can be realized in a centralized fashion in
9 one computer system, or in a distributed fashion where different elements are spread
10 across several interconnected computer systems. Any kind of computer system - or other
11 apparatus adapted for carrying out the methods described herein - is suitable. A typical
12 combination of hardware and software could be a general purpose computer system with a
13 computer program that, when being loaded and executed, controls the computer system
14 such that it carries out the methods described herein. The present invention can also be
15 embedded in a computer program product, which comprises all the features enabling the
16 implementation of the methods described herein, and which - when loaded in a computer
17 system - is able to carry out these methods. Computer program means or computer
18 program in the present context is meant to include any expression, in any language, code
19 or notation, of a set of instructions intended to cause a system having an information
20 processing capability to perform a particular function either directly or after either or both
21 of the following a) conversion to another language, code or notation; b) reproduction in a
22 different material form.

23 While various embodiments of the invention have been discussed herein with
24 respect to specific embodiments by way of illustration, not limitation, the scope of the
25 invention is to be construed on the basis of the following claims.